1969

OPERATING SUMMARY

PORT DOVER

water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

D.S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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PORT DOVER

water pollution control plant

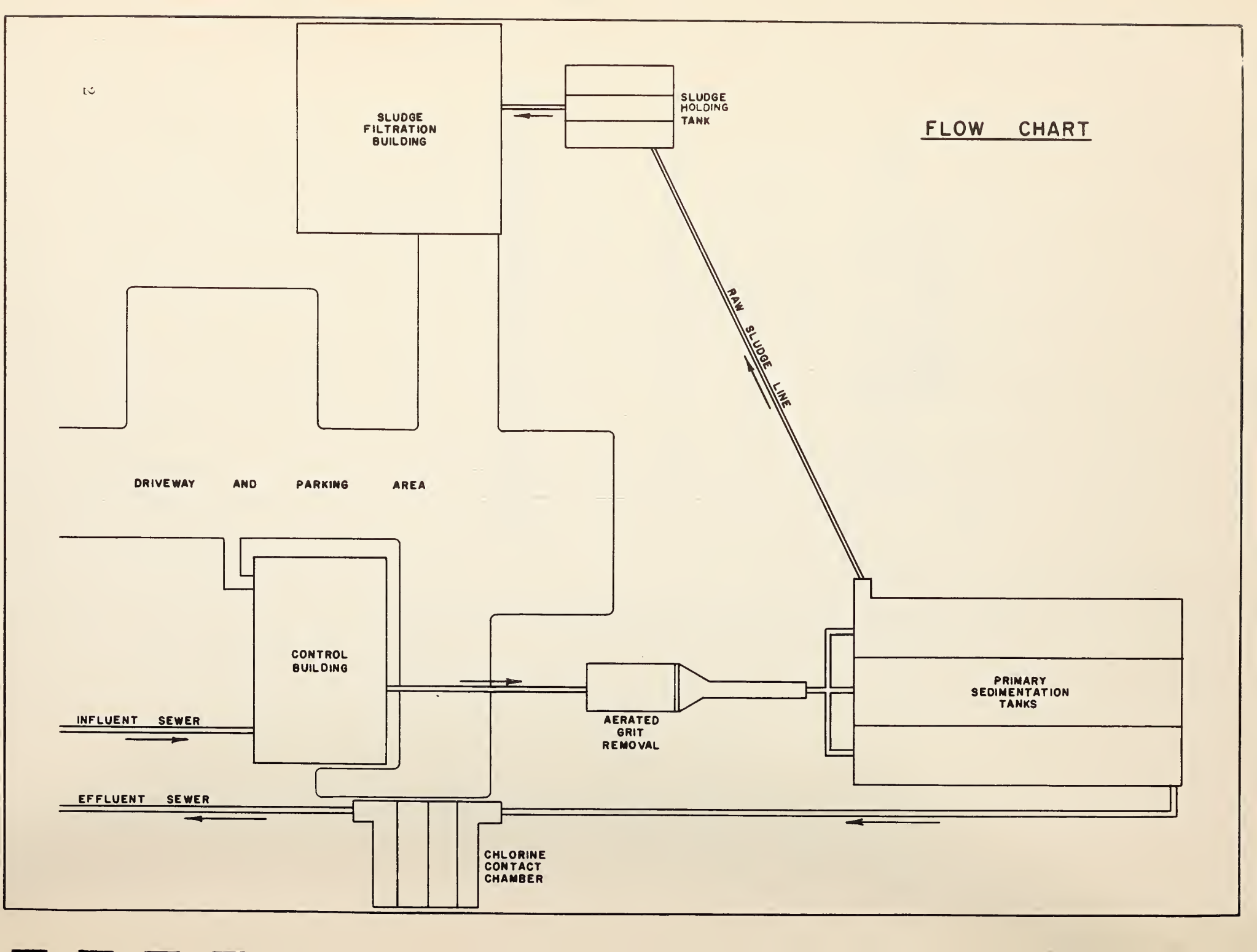
operated for

THE TOWN OF PORT DOVER

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY


FLOW CHART
SLUDGE FILTRATION BUILDING
SLUDGE HOLDING TANK
RAW SLUDGE LINE
DRIVEWAY AND PARKING AREA
CONTROL BUILDING
INFLUENT SEWER
AERATED GRIT REMOVAL
PRIMARY SEDIMENTATION TANKS
EFFLUENT SEWER
CHLORINE CONTACT CHAMBER

DESIGN DATA

PROJECT NO.	2-0115-62	TREATMENT	Primary
DESIGN FLOW	2.1 mgd	DESIGN POPULATION	5,300
BOD - Raw Sewage	210 mg/l	SS - Raw Sewage	296 mg/l
- Removal	30%	- Removal	60%

RAW SEWAGE PUMPS

Type: Worthington
Size: One 800 gpm @ 24' tdh
One 500 gpm @ 24' tdh
Two 1750 gpm @ 25' tdh

PRIMARY TREATMENT

Grit Removal

Type: Aerated, mechanical grit collector (Rex Chainbelt)
Size: One 20' x 10' x 11.85' (14,750 gal)
Retention: 10 min

Air Supply

Type: Roots-Connersville
Size: Two 130 scfm

Primary Sedimentation

Type: Rex Chainbelt
Size: Three 75' x 15' x 8' (168,000 gal)
Retention: 1.93 hr
Loading: Surface, 620 gal/ft^2/day
Weir, 46,500 gal/ft/day

CHLORINATION

- F & P automatic

Chlorine Contact Chamber

Size: One 21½' x 18' x 6½' (15,950 gal)
Retention: 11 min

OUTFALL

- to Lake Erie

SLUDGE HANDLING

Aerated holding tank, one, 20' x 15' x 8.2' (avg.)
Size: 2,460 ft^3 or 12,750 gal

Vacuum Filter

Type: Eimco (cloth)
Size: One 200 sq ft

PUMPS -- TYPE AND SIZE

#1 Pumping Station (custom-built)

Type: Worthington
Size: Three 1750 gpm @ 66' tdh (station has one Barminutor, Model C)

#2 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 417 gpm @ 48' tdh

#3 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 207 gpm @ 65' tdh

#4 Pumping Station

Type: Flygt submersible
Size: Two 217 gpm @ 19' tdh

NOTE: Above pumping stations have overflows to Lynn River

'69 REVIEW

GENERAL

The Port Dover water pollution control plant is a 2.10 mgd primary treatment plant consisting of screening facilities, an on-site pumping station, aerated grit removal, primary settling, chlorination, raw sludge storage and vacuum filtration. There are four remote pumping stations, -- two prefabricated, one submersible and one custom-built -- with screens and barminution and chlorination facilities. The project is operated and maintained by a chief operator and an operator. During 1969 there were no major operating problems.

EXPENDITURES

The total operating cost for the year was $27,326.42, $208.42 per million gallons of sewage treated. The unit cost of treating one pound of BOD remained the same as the 1968 value of 12 cents.

PLANT FLOWS and CHLORINATION

The average daily flow was 0.36 mgd, approximately 17% of design and slightly higher than in 1968. The maximum day recorded was 1.45 million gallons or 0.65 million gallons less than design.

Disinfection of the final effluent by chlorination is practised from April through October to avoid danger to public health from recreational use of the receiving water. The total 1969 consumption increased slightly due to corresponding increases in BOD loading and flows.

PLANT EFFICIENCY

The average BOD and suspended solids concentration was 278 milligrams per litre and 259 mg/l in the influent, and 109 mg/l and 53 mg/l in the effluent. The removal efficiencies for BOD and suspended solids were 61% and 80%, above average for a primary plant.

The grit removal was approximately 1.86 cubic feet per million gallons,

which is higher than the 1968 average and within the normal range for sanitary sewage.

VACUUM FILTRATION

As usual two methods of sludge filtration were required. Conventional chemicals were used in filtering a total of 39.3 tons of dry solids, while polyelectrolytes were used in filtering an additional 36.2 tons.

The average yield of 6.3 pounds of dry sludge per square foot of filter area has increased over the 1968 value and is considered normal for this operation. The chemical requirements of the sludge, lime at 9.4% and ferric chlorine at 2.0%, were lower than the 1968 values. This can be attributed to the unusual characteristics of this sludge as a result of industrial wastes.

A total of 66 lbs. of polyelectrolyte was required to filter 36.2 tons. If lime and ferric chlorine had been used, an additional 8400 pounds of these chemicals would have been required, resulting in additional costs.

The chemical cost of using polyelectrolytes to filter 36.2 tons of sludge was $82.50, or $2.28 per ton of dry solids. Comparative costs using conventional methods to filter 39.3 tons of sludge were $703.50, or $17.90 per ton of dry solids. Unfortunately, polyelectrolytes cannot be used to treat all of the sludge.

CONCLUSIONS

During 1969, the Port Dover water pollution control plant produced a final effluent that met or exceeded the design expectations for a primary treatment plant. However, the effluent did not at all times meet the Ontario Water Resources Commission effluent objective of 15 mg/l for both BOD and suspended solids.

Further experimentation with polyelectrolytes for vacuum sludge filtration produced favourable results, with a substantial reduction in unit cost. However, it has not been possible to use polyelectrolytes under all circumstances.

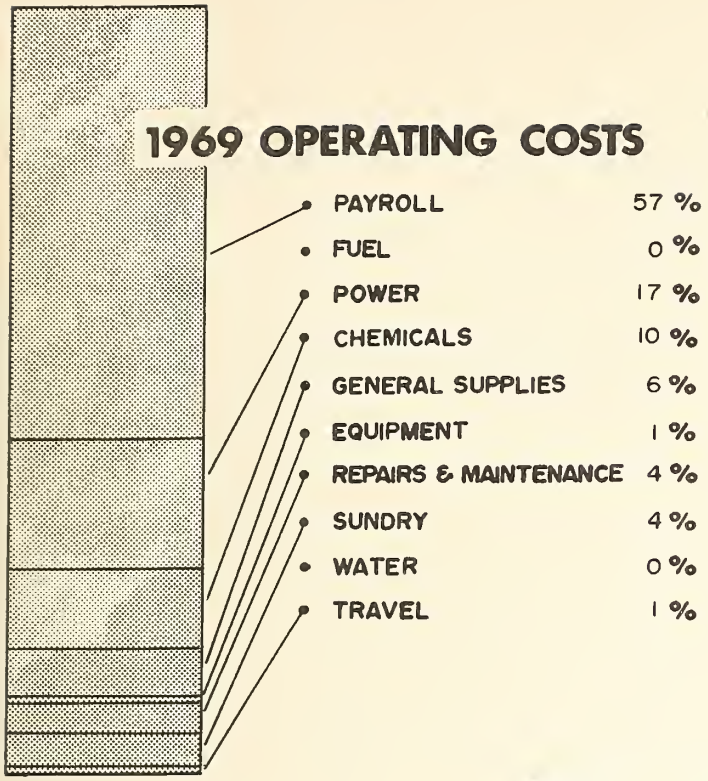
The proximity of the Town of Port Dover to the Nanticoke Hydro project may result in a rapid population increase. The Town has therefore requested the Ontario Water Resources Commission to take over the present municipal project as a Provincial scheme. This request is now under consideration.

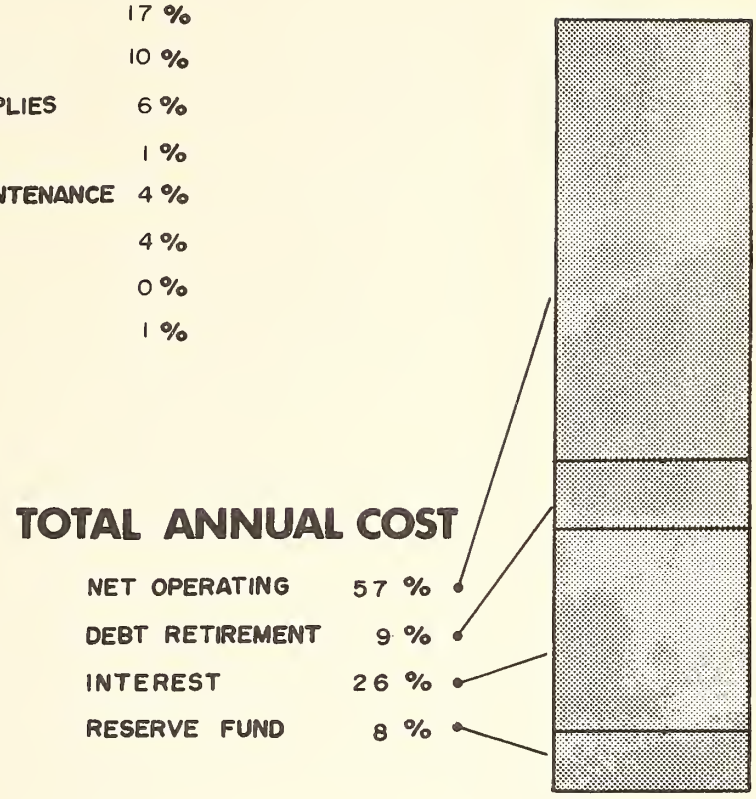
PROJECT COSTS

NET CAPITAL COST (Final)	$684,451.08
DEDUCT - Portion financed by CMHC/MDLB (Final)	463,731.87
Long Term Debt to OWRC	$220,719.21
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 29,644.77
Net Operating	$ 27,326.42
Debt Retirement	4,454.00
Reserve	3,821.93
Interest Charged	12,356.93
TOTAL	$ 47,959.28

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 22,355.07
Deposited by Municipality	3,821.93
Interest Earned	1,356.37
	$ 27,533.37
Less Expenditures	-
Balance @ December 31, 1969	$ 27,533.37



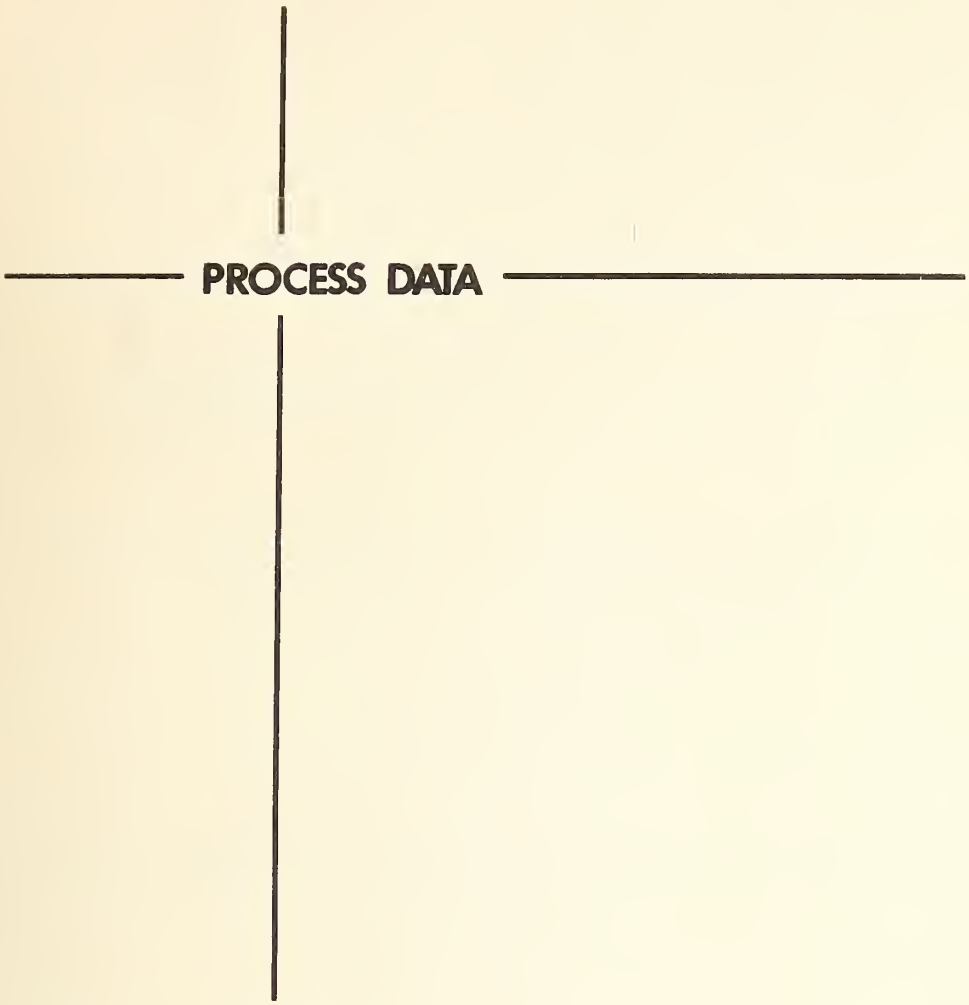


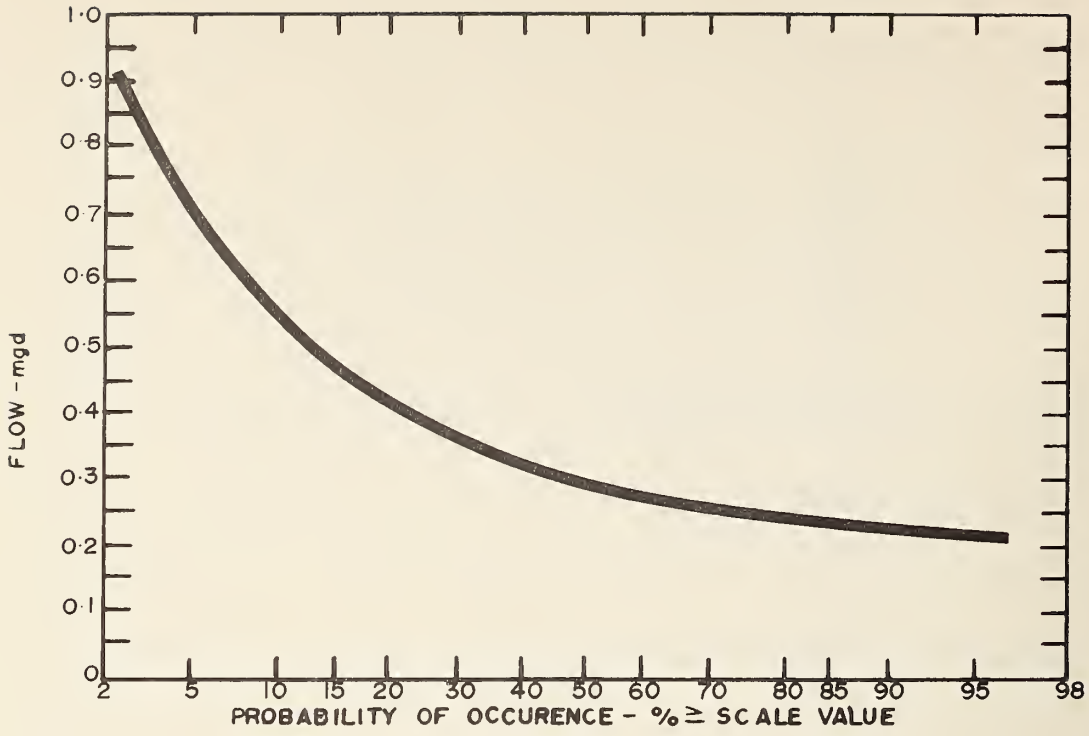
Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	126.92	$23,343.94	$183.93	9 cents
1966	127.71	23,641.32	185.12	10 cents
1967	114.26	22,671.63	198.42	21 cents
1968	122.53	23,368.29	190.71	12 cents
1969	133.42	27,326.42	208.42	12 cents

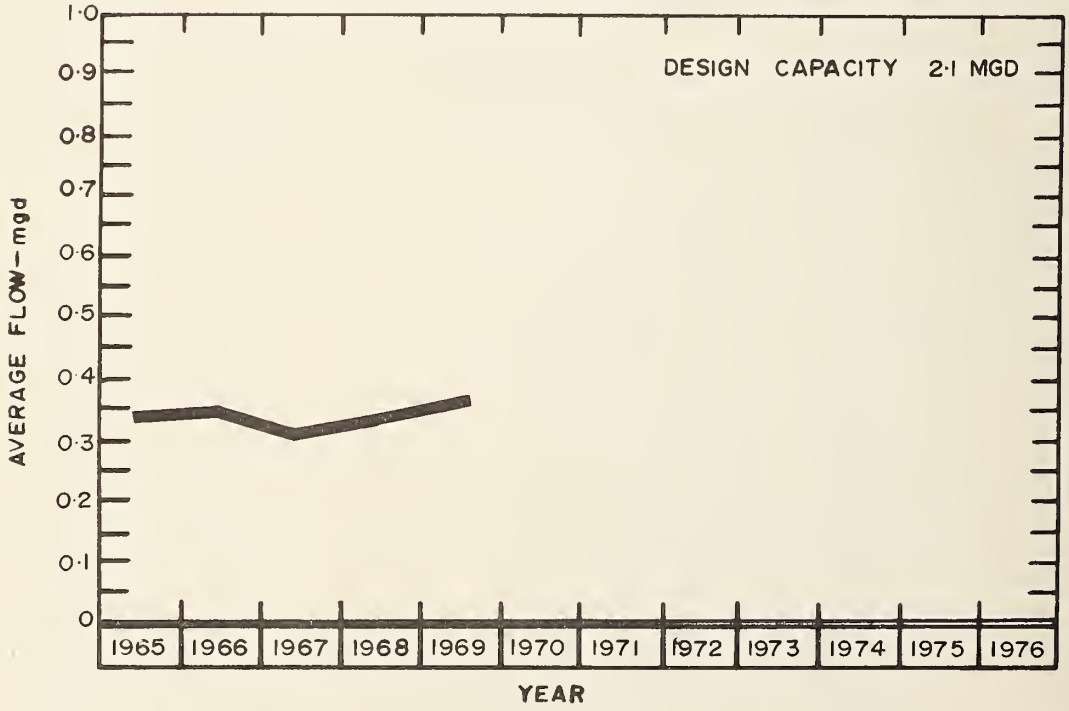
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY	WATER	TRAVEL
JAN	2252.23	1653.12	-	-	295.84	146.55	46.72	-	110.00	-	-	-
FEB	1931.90	1147.64	-	-	487.78	-	115.18	163.61	-	17.69	-	-
MAR	2401.20	1102.66	-	-	507.57	596.64	139.92	-	-	54.51	-	-
APR	1937.87	1261.26	-	-	405.73	-	108.92	-	158.27	3.69	-	-
MAY	2151.37	1275.08	-	-	519.94	-	94.03	167.83	-	94.49	-	-
JUNE	1661.28	1134.01	-	-	336.78	-	112.58	-	-	72.91	-	5.00
JULY	1770.27	1139.16	162.46	-	240.83	-	99.49	-	-	19.58	-	108.75
AUG	3050.43	1664.10	405.96	-	247.33	477.30	192.96	-	46.04	16.74	-	-
SEPT	2126.86	1116.73	22.80	-	249.85	499.22	83.69	-	109.00	45.57	-	-
OCT	2199.45	1114.63	-	-	265.89	551.25	168.40	-	99.28	-	-	-
NOV	1682.51	1116.32	-	-	326.65	-	48.19	-	144.36	46.99	-	-
DEC	4161.05	1476.77	-	-	652.82	419.98	340.75	-	499.84	712.09	-	58.80
TOTAL	27326.42	15201.48	591.22	-	4537.01	2690.84	1550.83	331.44	1166.79	1084.26	-	172.55


PROCESS DATA


1·0
0·9
0·8
0·7
0·6
0·5
0·4
0·3
0·2
0·1
0
FLOW - mgd
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

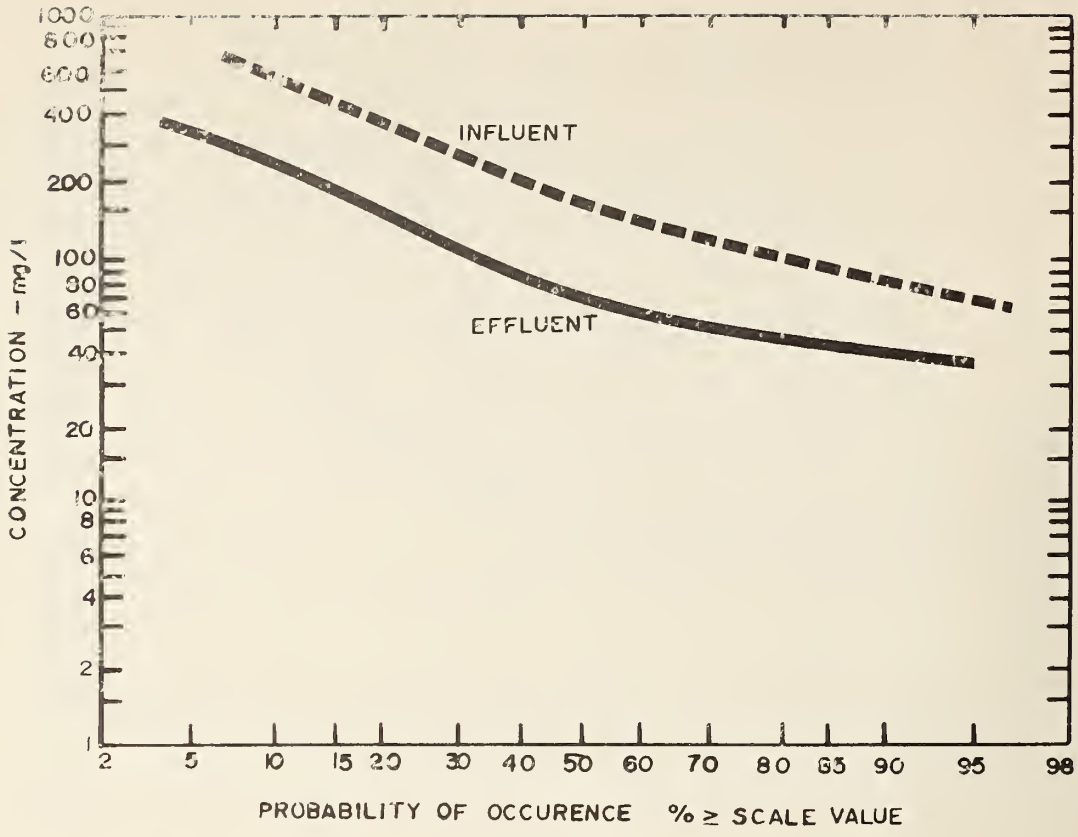
FLOWS


1·0
0·9
0·8
0·7
0·6
0·5
0·4
0·3
0·2
0·1
0
AVERAGE FLOW - mgd
DESIGN CAPACITY 2·1 MGD
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
YEAR

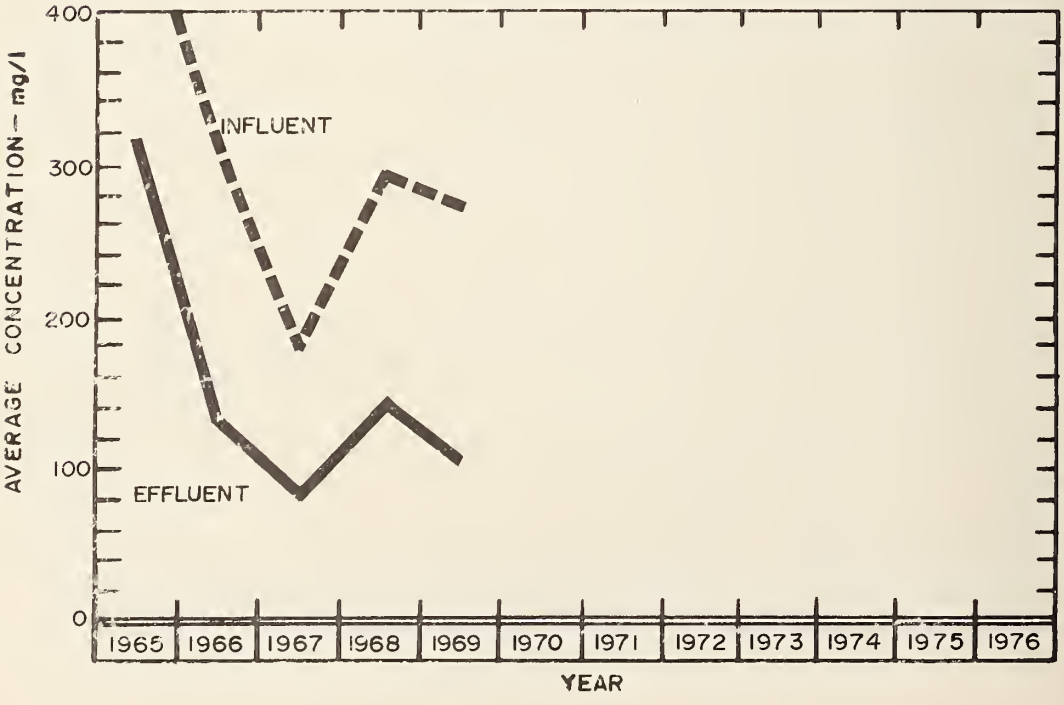
PLANT FLOWS and CHLORINATION

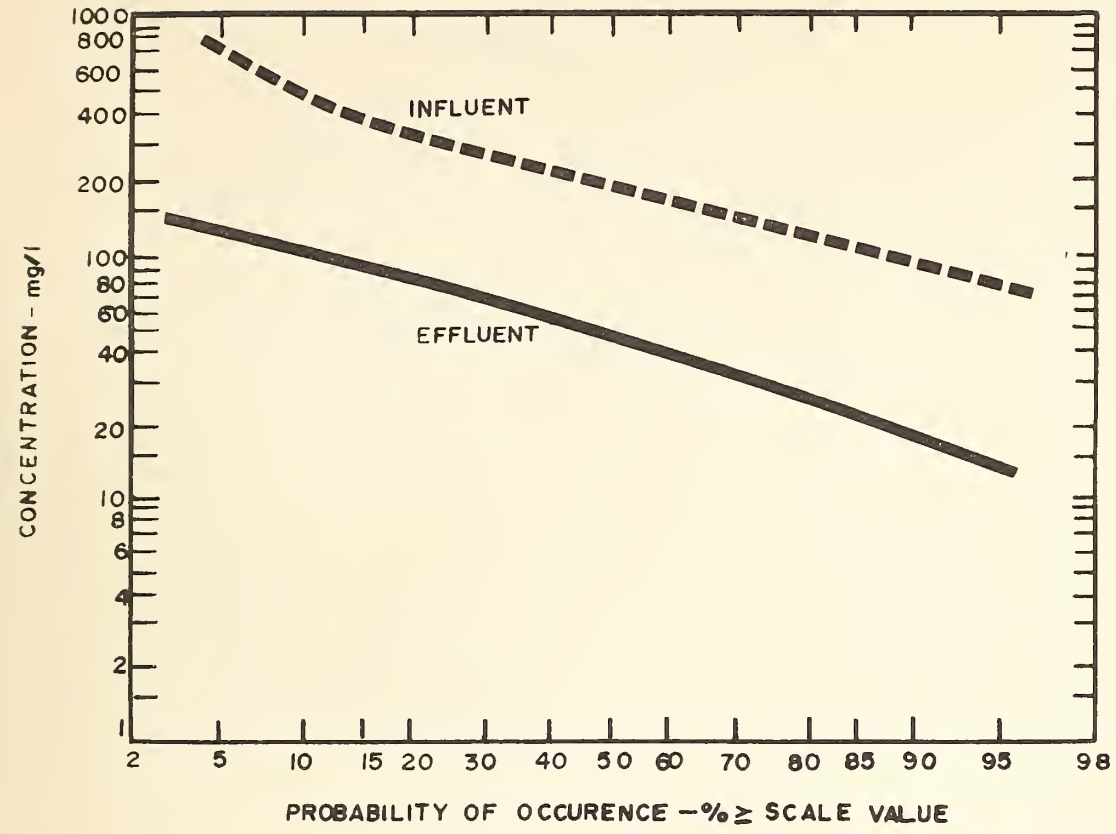
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	12.28	.40	1.45	.21	0	0
FEB	8.34	.30	.96	.20	0	0
MAR	9.66	.31	.87	.18	0	0
APR	19.82	.66	1.43	.36	1.21 *	7.0
MAY	13.00	.42	.89	.25	.97	7.5
JUNE	9.90	.33	.48	.24	.92	9.2
JULY	10.38	.33	.80	.22	2.06	19.9
AUG	9.77	.32	.55	.24	1.70	17.4
SEPT	9.15	.30	.40	.23	1.87	20.5
OCT	8.87	.29	.47	.19	1.39	15.7
NOV	11.60	.37	.90	.22	0	0
DEC	10.65	.34	.90	.20	0	0
TOTAL	133.42	-	-	-	10.12	-
AVERAGE	-	.36	-	-	1.45	13.8

* Chlorination for 26 days

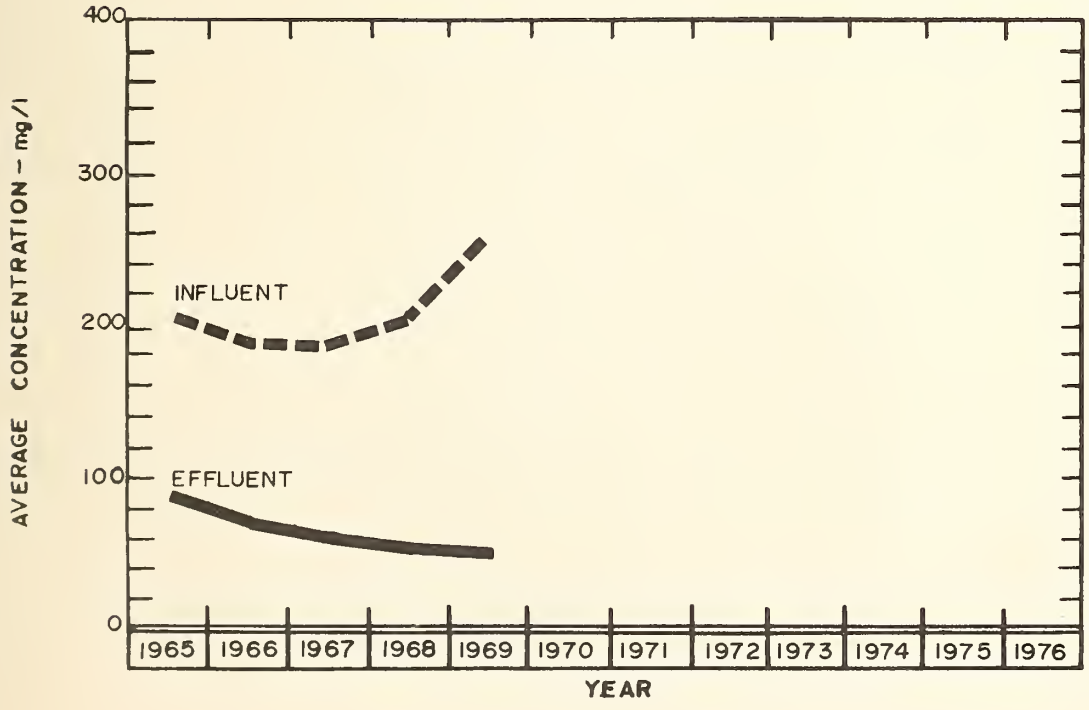


BIOCHEMICAL OXYGEN DEMAND



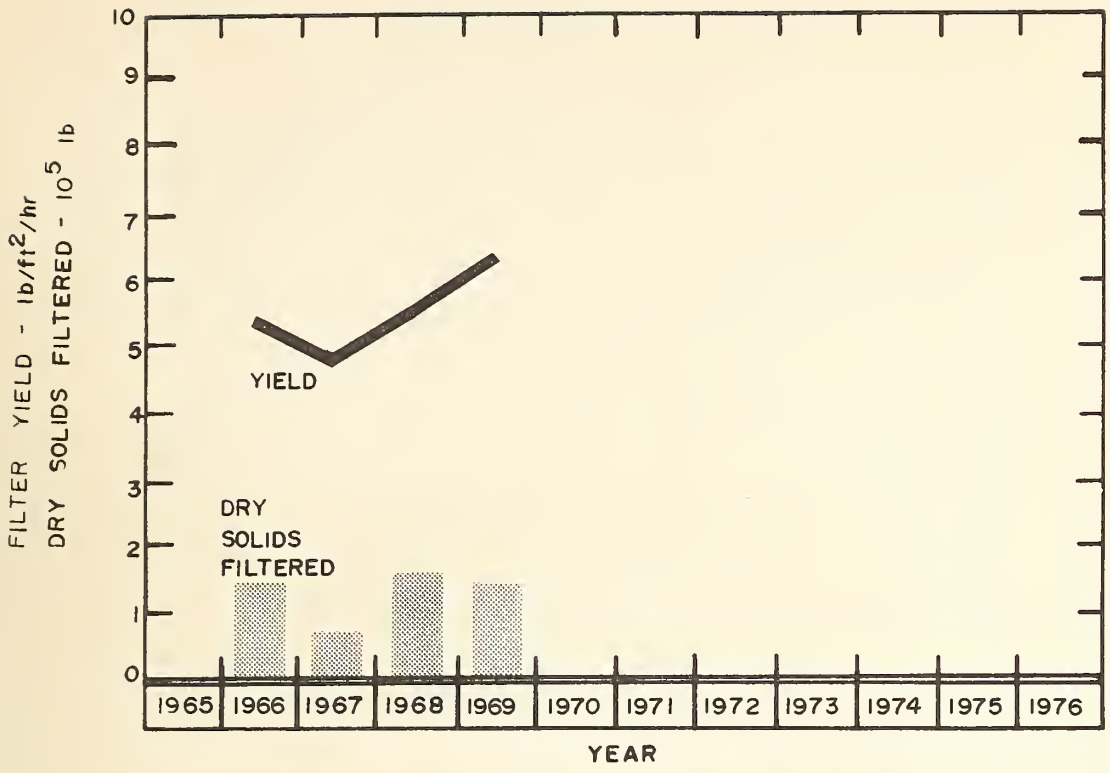


SUSPENDED SOLIDS

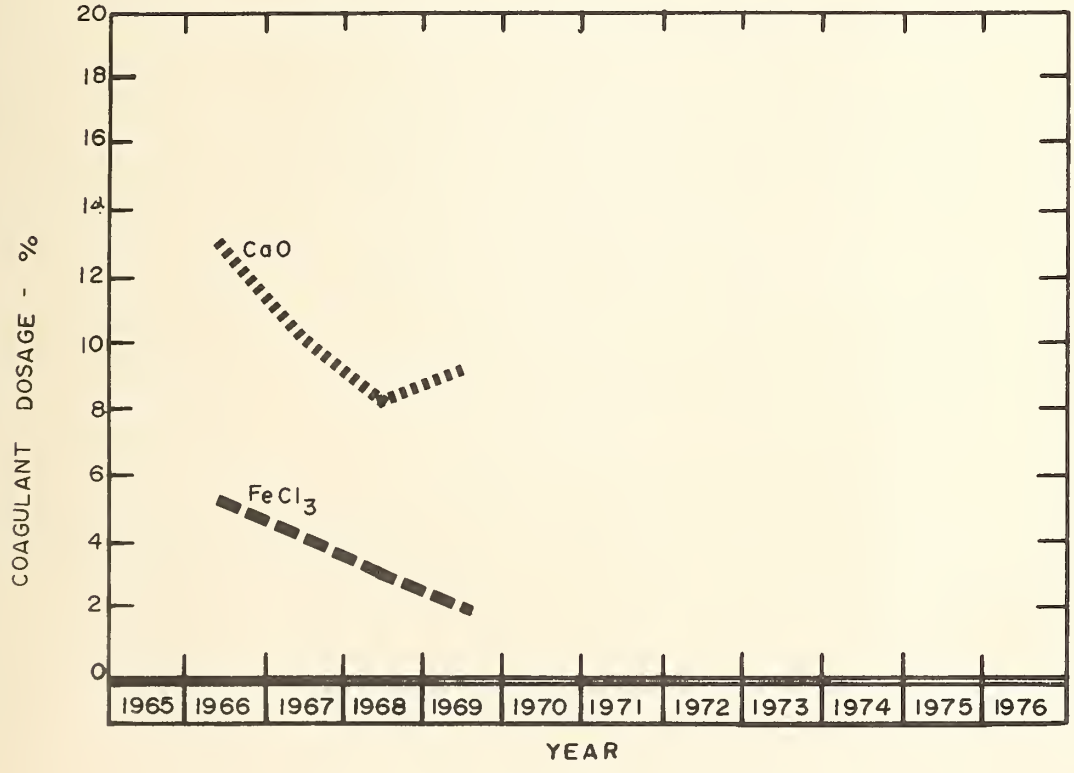


PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION		
	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	cu ft
JAN	105	38	64	8.2	164	40	76	15.2	30
FEB	87	52	40	2.9	136	24	82	9.3	0
MAR	160	55	66	10.1	253	36	86	21.0	0
APR	130	65	50	12.9	143	45	68	19.4	0
MAY	212	98	54	14.8	249	45	82	26.5	28
JUNE	145	77	47	6.7	201	33	84	16.6	35
JULY	390	150	61	24.9	517	74	86	40.0	0
AUG	390	155	60	23.0	365	116	68	24.3	18
SEPT	850	352	59	45.6	511	103	80	37.3	70
OCT	545	170	69	33.3	291	65	78	20.0	54
NOV	160	55	65	12.2	115	33	71	9.5	12
DEC	160	48	70	11.9	164	20	87	15.3	-
TOTAL	-	-	-	-	-	-	-	260.4	247
AVERAGE	278	109	61	17.2	259	53	80	21.7	35



VACUUM FILTRATION



VACUUM FILTRATION

MONTH	TOTAL FILTER USE hr	SLUDGE		CONDITIONING CHEMICALS						FILTER CAKE % TS	FILTR. % TS	YIELD lb/hr / sq ft
		TOTAL SOLIDS %	DRY SOLIDS 10^3 lb	CaO		$FeCl_3$		POLYMER				
				USED lb	DOSE %	USED lb	DOSE %	USED lb	DOSE ppm			
JAN	7	10.2	8.6	245	5.7	55	0.6	8.0	44	22	0.9	6.2
FEB	6	8.3	9.4	0	0	0	0	2.0	2	25	0.2	7.2
MAR	13	5.7	11.8	0	0	0	0	9.0	53	26	0.3	4.5
APR	6	6.6	6.3	0	0	0	0	5.5	14	21	0.7	5.3
MAY	12	5.4	11.6	0	0	0	0	8.5	12	12	0.4	4.8
JUNE	10	8.5	15.0	0	0	0	0	11.0	5	23	0.6	7.9
JULY	16	7.6	18.4	385	8.4	109	2.4	14.0	14	25	0.4	5.6
AUG	11	9.9	17.1	1085	9.8	137	1.2	8.0	23	22	1.0	8.4
SEPT	14	9.0	19.3	2100	10.9	518	2.7	0	0	29	0.8	6.7
OCT	14	9.0	14.7	1610	11.0	410	2.8	0	0	25	0.8	5.9
NOV	14	9.7	18.8	2030	10.8	410	2.2	0	0	30	0.9	6.9
DEC	0	-	-	-	-	-	-	-	-	-	-	-
TOTAL	123	-	151.0	7455	-	1639	-	66.0	-	-	-	-
AVERAGE	11	8.2	13.7		9.4		2.0		21	25	0.6	6.3

Water management in Ontario